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TWO NEW *DEMATIACEOUS* FUNGI FROM WEST BENGAL, INDIA

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ABSTRACT

This communication deals with the description and illustrations of two undescribed species of *Cercosporoid* fungi viz. *Cercospora krishnathii* Haldar sp.nov. and *Cladosporium dioscorae* Haldar sp.nov., growing on the living leaves of *Ricinus communis* (Euphorbiaceae) and *Dioscorea alata* (Dioscoreaceae) collected from Murshidabad district, West Bengal, India

Key Words: Follicolous hyphomycetes, Morphotaxonomy, New species

INTRODUCTION

The genus *Cercospora* was erected by Fresenius (1863), which is one of the largest genus of hyphomycetes producing vermicular fragmosporic conidia. This genus is globally distributed and represented by around 3000 species. In fact, it is a heterogeneous assemblage of hyphomycetes representing a “complex” (*Cercospora* complex), rather than a single generic entity. The taxonomic position of the genus *Cercospora* is almost accepted as being a member of the form family *Mycosphaerallaceae*, under the order *Hyphomycetes* of the form class *Deuteromycetes*. A large number of the species of *Cercospora* is pathogenic with diversified host range and most of them are known only from their morphotaxonomical characters *in vivo*. The reproductive structure of the fungi is the *conidia*, acropleurogenous, simple obclavate or subulate, colourless or pale, pleuriseptate, smooth. *Conidiophores* macronematous, mononematous, caespitose, straight or flexuous, sometimes geniculate, unbranched or rarely branched, olivaceous brown or brown, paler towards the apex, smooth.

The genus *Cladosporium* was established by Link in 1815. It has been named as “Klados” means a branch, hence branched spore chains and he cited *Cladosporium herbarum* (Pers: Fr.) Link ex S.F. Gray is the type species. The taxonomic position of the genus *Cladosporium* is almost accepted as being a member of the form family *Cladosporiaceae* under the order *Hyphomycetes* of the form class *Deuteromycetes*.

Conidiophores macronematous or semi macronematous and sometimes also micronematous, macronematous conidiophores straight or flexuous, mostly unbranched or with

branches, restricted to the apical region forming a stipe and head, olivaceous brown or brown, smooth or verrucose. *Ramo-conidia* often present. *Conidiogenous cells* polyblastic, usually integrated, terminal and intercalary but sometimes discrete, sympodial, more or less cylindrical, cicatrized, scars usually prominent. *Conidia* catenate as a rule but sometimes solitary especially in species with large conidia, often in branched chains, acropleurogenous, simple, cylindrical, doliiform, ellipsoidal, fusiform, ovoid, and spherical or sub spherical, often with a distinctly protuberant scar at each end or just at the base, pale to dark olivaceous brown, smooth, verrucose or echinulate, with 0-3 or occasionally more septa.” (Ellis, 1976).

Researchers’ from all over the world have made valuable contributions on the *Cercosporoid* fungi and the systematic of the taxons are given in accordance with Amanuelah , & Zafari, D. 2015, Avasthi *et al.* 2016, Begum 2009, Bensch, K. *et al.* 2015, Braun, U. 2001, Braun, U., & Crous, P. W. 2007, Bligami *et al.* 1991, Bhat, J. 2010, Cannon PF, Kirk PF. 2007, Castaneda RF, Kendrick B. 1990, Chupp, C. 1954, Deighton, F.C. 1990, Haldar & Ray J.B. 2011, Hesami *et al.* 2011, Groenewald, M. *et al.* 2005, Huang, F. *et al.* 2015, Jang, Y. *et al.* 2013, Kamal 2010, Plakthongdee, S. *et al.* 2013, Ruiz, R. C., & Braun, U. 1989, Sandoval-Denis, M. *et al.* 2016, Schubert, K., & Braun, U. 2005, Seifert, K. A., & Gams, W. 2001, Seifert *et al.* 2011, Souza, A. G. C. *et al.* 2011, Thauang, M. M. 1974 and Ying Lan, G. 2012.

During working on the foliicolous fungi of Murshidabad district of West Bengal the author had collected two members of Hyphomycetes growing on the living leaves of

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Ricinus communis (Euphorbiaceae) and *Dioscorea alata* (Dioscoreaceae), which on critical examination found to be two new species of the genus *Cercospora* and *Cladosporium* respectively. Hence, these two species *Cercospora krishnathii* Halder sp.nov. and *Cladosporium dioscoreae* Halder sp.nov. have been created as new taxa.

MATERIALS AND METHODS

The infected leaves of different ages were detached intact from the host plants and they were kept in polythene bags and processed by following standard techniques (Castaneda-Ruiz 2005). The infected leaves having distinct symptoms were collected and dried to make herbarium specimens. Photographs of the infected spots on the host leaves were captured by Sony DSC-HX200 camera and for the examination of fungal structure and spore morphology, the microscope slides were prepared in lacto-phenol cotton blue mixtures. Depending on the size of the leaf and the nature of infection the entire or a little part of the infected tissue was detached carefully with a sharp scalpel. It was then mounted on a glass slide in a drop of lacto phenol and covered with a cover glass and lukewarm on a flame so as to make the host tissue transparent. Morphotaxonomic study of the associated fungi was done through the low and high magnification 100x400 of the compound microscope, (Olympus-CX21i FS1 Research Microscope) by using USB INSTA CMOS camera. The microphotographs were stored in electronic format JPEG. Morphotaxonomic determinations of the new taxa were justified with the help of literature mentioned above. Holotypes being deposited at AMH, Agharkar Research Institute (ARI), Pune (MS), India and isotypes retained in the Departmental herbarium for future reference.

RESULTS AND OUTCOME

Cercospora krishnathii Halder sp.nov.

Mycobank 819879

Etymology: in commemoration of Raja Krishnath Roy who intend to introduced modern education in Murshidabad district of West Bengal.

Incidence in winter, very virulent, older leaves more affected, spots distinct, spots formed amphigenous, more distinct on dorsal surface, scattered to coalescent, covering the major surface of the leaf area, angular to irregular, bounded by stronger or finer veins, cinnamon yellow to white, 2-12 mm in extent; *caespituli* amphigenous, better on dorsal surface, somewhat thickly and evenly distributed over the spots; **Sexual morph**: undetermined. **Asexual morph**: *stroma* well developed, globular, formed by some dark brown cells, average length 387.34µm and breadth 247.42µm in diam;

mycelium internal; *conidiophores* majority compactly fascicled, consisting of 2-18 divergent stalks, few solitary, light brown, hyaline and gradually slightly narrower towards the tip, straight to flexuous, unbranched, continuous to septate, 2-8 transverse septa towards the base, 1-8 geniculate, spore scar distinct (2-8 in number), apex blunt, average length 1014.94µm and breadth 44.41µm; *conidia* hyaline, oblate to linear, straight to curved, smooth walled, tip sub obtuse to acute, base truncate with a thickened and large hilum (18.11µm), 3 to many septate, average length 594.38µm and breadth 21.74µm.

Cladosporium dioscoreae Halder sp. nov

Mycobank 819906

Etymology: the specific epithet *dioscoreae* in reference to the host genus.

Incidence in winter, spots formed on both surfaces of the lamina, distinct, numerous, angular to irregular, sometimes irregular, sometimes shooty appearance, spots greyish on dorsal surface and blackish on ventral surface, surrounded by raised yellow margin forming shot-hole, often coalescent, 1.5-56.50mm in extent; **Sexual morph**: undetermined. **Asexual morph**: *caespituli*, epiphyllous, effuse, punctiform, brown to black, evenly distributed over the spots mycelium both immerse and superficial *stroma* thick-walled, composed of isodiametric type of cells, deep brown; *conidiophores* single to fasciculate, fascicles consisting of 1-6 divergent stalks, arising from epidermal hairs or rarely through stomata, straight to flexuous sinuous, brown to pale brownish, paler towards the tip, simple to branched. smooth, sometimes nodose, thick-walled and smooth, pluriseptate up to 12, occasionally geniculate, mature conidial scar present and conspicuous, situated at the tip or lying at the point of geniculation of the conidiophores often a single chain of conidia is attached at the tip of the conidiophores, tip sub acute to obtuse or sometimes swollen, average length 681.06µm and breadth 43.28 µm; *conidia* solitary or in catenate up to 8 in chain, straight, cylindric, thin-walled, smooth to verruculose, pleuriseptate up to 5 septa distinct, often with a distinct protuberant scars at each or both the end of the conidium, average length 212.31µm and breadth 51.59µm.

Material examined: On *Dioscorea alata* (Fam. Dioscoreaceae), Lalbagh, Murshidabad, West Bengal, India, Dinesh Halder, 25th December, 2015, AMH9772 (**Holotype**), KNC0280 (**Isotype**).

DISCUSSION

The fungi *Cercospora krishnathii* and *Cladosporium dioscoreae* has been found to occur profusely during winter months to spring and early summer. The host plants *Ricinus com-*

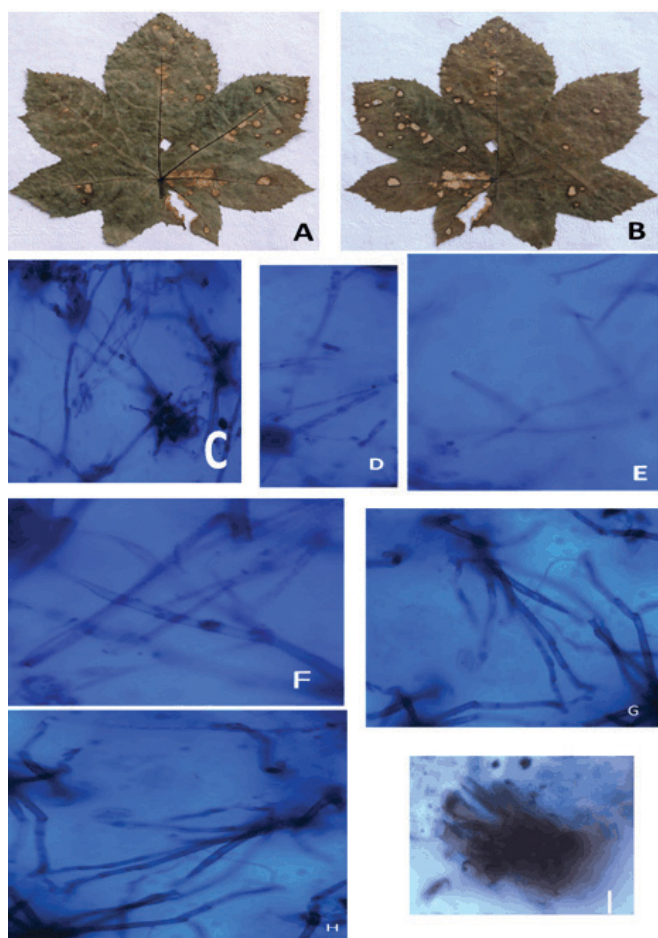


Figure 1: *Cercospora krishnathii* on *Ricinus communis*. A–B: leaf spots, C&H- conidiophore fascicles, D, E & F- conidia, I- stroma, Scale bars=20 mm.

Material examined: On the living leaves of *Ricinus communis* L.(Fam. Euphorbiaceae).Goaljan ,Murshidabad,West Bengal, India. 24th December, 2015, Dinesh Haldar, AMH 9765(Holo-type), KNC0258 (Isotype).

munis and *Dioscorea alata* both are economically important. The seed oil of *Ricinus communis* is used as purgative, lubricant and biodiesel. On the other hand the tuber of *Dioscorea alata* is edible and is the source of diosgenin- a contraceptive agent. The fungi attacks chiefly on the leaf lamina, the primary area of photosynthesis resulting of which the yield is severely damaged, causing great economic losses.

CONCLUSION

The newly described taxa *Cercospora krishnathii* and *Cladosporium dioscorae* are the primary causes of leaf spot diseases of *Ricinus communis* and *Dioscorea alata* respectively. The present work will be helpful to a fungal taxonomist to arrange the fungi in different groups and easier to identify

the diseases on the basis of which a plant pathologist can design the control measures of the diseases.

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